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		Art Unit	1763
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By Nina L. McNeill
Nina L. McNeill

PATENT
Attorney Docket No. A4231/T34410
AMAT No.
A4231/USA/D01/DSM/HDP/CVD/JW
TTC No. 016301-034410US

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

In re application of:

Michael Kwan et al.

Application No.: 09/920,891

Filed: August 2, 2001

For: GAS CHEMISTRY CYCLING TO
ACHIEVE HIGH ASPECT RATIO
GAPFILL WITH HDP-CVD

Examiner: Kackar, Ram N.

Art Unit: 1763

APPELLANT REPLY BRIEF UNDER 37
CFR §1.193

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Sir:

Appellant offers this Reply Brief in response to the Examiner's Answer mailed on October 23, 2003. This Brief is submitted in triplicate. The following remarks are intended to further focus the issues in this appeal.

While both Appellant's Brief and the Examiner's Answer discuss Sherstinsky and Kholodenko, Appellant notes that these references have not actually been applied in the

rejections, which rely solely on the combination of Hong and Papasouliotis. Further, the Examiner appears to continue to rely on Papasouliotis for the separate cooling step recited in the claims merely because it discloses that temperature may be one of several variables that may be changed in effecting a transition from deposition to etching. Appellant has already noted that the language in Papasouliotis does not necessarily require a temperature change, so the limitation is not inherent, and the Examiner has previously noted that even where there might be a temperature change, it does "not explicitly disclose that the changing of temperature would be a cooling step" (Office Action mailed January 2, 2003, p. 4). Indeed, while discussing etching characteristics, Papasouliotis discloses only "modulat[ing]" the temperature, i.e. maintaining it within a limited range, very much like the supplementary references of Sherstinsky and Kholodenko:


Thus, the range of operating pressures and the power levels used in the etching steps are chosen to satisfy this requirement [that cusps be removed without corner clipping]. Wafer temperature can be modulated either by clamping the wafer on the electrostatic chuck (ESC) and cooling the wafer using He or by using a heated ESC.
(Papasouliotis, Col. 8, ll. 21 - 26).

In this discussion of temperature modulation during etching, Papasouliotis contemplates either that the temperature may be maintained less than would be provided solely by the plasma, so that the wafer be "cooled" using He, or that the temperature may be maintained greater than would be provided solely by the plasma, so that the wafer be "heated" with the electrostatic chuck. These possibilities teach nor suggest nothing about the relative temperatures during the deposition and etching phases, and are counter to the Examiner's conclusion that the etching must necessarily be at a lower temperature than the deposition.

Also, while the Examiner's Answer has focused on Sherstinsky and Kholodenko as supplementary references, Appellant notes that these references do not illustrate the diversity of temperature effects on etching. The Board's attention is drawn to footnote 1 on page 6 of Appellant's Brief in which Becker and Wang are discussed, both of which were also initially cited by the Examiner during prosecution of the application, and both of which illustrate very different roles for temperature on etching.

There continues to be no adequate motivation to combine the teachings of Hong, directed at PECVD applications, with Papasouliotis, directed at HDP-CVD applications, in light of Papasouliotis's specific cautions about the significant chemical and physical differences between those processes in the context of dep/etch/dep processes (*see* Papasouliotis, Col. 2, ll. 11 – 57). The Court of Appeals for the Federal Circuit has repeatedly emphasized the need to apply the requirement that there be a motivation to combine references rigorously, cautioning that such rigor is “the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis.” *In re Dembiczak*, 50 USPQ2d 1614, 1617 (Fed. Circ. 1999). “The need for specificity pervades this authority.” *In re Lee*, 61 USPQ2d 1430, 1433 (Fed Cir. 2002). In this instance, the Examiner appears to be engaging in exactly the impermissible hindsight analysis that the rigorous nature of the requirements is intended to prevent.

Respectfully submitted,


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